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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/585,781	07/11/2006	Daiki Kudo	1163-0572PUS1	1387

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EXAMINER	
PATEL, NIRAV G	
ART UNIT	**PAPER NUMBER**
2624	

NOTIFICATION DATE	DELIVERY MODE
05/28/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)
	10/585,781	KUDO ET AL.
	Examiner	**Art Unit**
	Nirav G. Patel	2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 February 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,17 and 21-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,17 and 21-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/11/2006*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

It would be of great assistance to the Office if all incoming papers pertaining to a filed application carried the following items:

1. Application number (checked for accuracy, including series code and serial no.).
2. Group art unit number (copied from most recent Office communication).
3. Filing date.
4. Name of the examiner who prepared the most recent Office action.
5. Title of invention.
6. Confirmation number (See MPEP § 503).

Response to Arguments

1. Applicant's arguments filed 2/16/2010 have been fully considered but they are not persuasive.

Applicants assert that the Examiner has incorrectly characterized the background section of the applicant's specification.

Examiner's Response - The Examiner has not characterized the Background as "AAPA," but only portions of it, which was conveyed in the Office Action. The cited portions explain the respective functions are conventional in the art, and therefore known, which therefore is used as AAPA.

Applicants assert that the combination of AAPA and Maeda fail to teach the limitations of the amended claims.

Examiner's Response – Please see analysis of amended claims

Applicants assert that Maeda does not possess the concept of encoding a difference between a predicted value and a DC component of a block.

Examiner's Response – Maeda is not relied upon for teaching encoding a difference, but is relied upon for teaching generating a predicted value. Using this predicted with the well known technique found in MPEG of encoding a difference between the predicted value and the DC component leads to the claimed invention as identified in the analysis of the claim below.

Applicants assert that Maeda does not teach or suggest a predicted reference value generator that generates a predicted reference value of each image from DC components obtained by orthogonal transformation of left-edge blocks of the image.

Examiner's Response – Maeda's teachings at Col. 9, Lines 45-57, teach that the image data is subjected to an orthogonal transformation, generating sequency components (a predicted reference value), which is a result of orthogonally transforming the left-edge of the image, yielding DC components. Therefore, the sequency components (predicted reference value) are taught by Maeda, without the need for a LUT, even though a limitation regarding a LUT is not required in the current claim language.

Applicants assert that as AAPA and Maeda fail to teach or suggest a predicted reference value, the rejection of claim 17 be withdrawn.

Examiner's Response – Please see response above.

Information Disclosure Statement

1. The information disclosure statement filed 7/11/2006 complies with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609. It has been placed in the application file, and the information referred to therein has been considered as to the merits.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 17, 21, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. (U.S. Pat. No.: 6,072,910, "Maeda") in view of Applicant's Admitted Prior Art ("AAPA").

1) Regarding Claim 1, Maeda teaches an image encoding apparatus comprising: a converter receiving an image signal, and carrying out orthogonal transformation on a block by block basis of an image frame to convert the image signal of individual block to DC components and AC components (Figure 1: Unit 13 is a orthogonal

transform unit which transforms the image input on a block by block basis to convert the image signal into individual blocks of DC and AC components);

a predicted reference value generator receiving the image signal, and generating a predicted reference value of each image frame from DC components obtained by orthogonal transformation of left-edge blocks of the image frame (Figure 4C: When the power concentrates are large in the horizontal edge, the blocks are independently vector-quantized (Cols. 9-10, Lines 58-67 &1-9), which is obtained by orthogonal transformations of the horizontal edge (left-edge blocks) (Col. 9, Lines 45-57), which generates a reference value as a result of the steps); and

said image encoding apparatus carries out quantizing and variable-length encoding of the AC components (Col. 4, Lines 12-20: The coding apparatus codes image data of every block, every block including AC components, which includes quantizing (and VLC) the data), carries out quantizing and variable-length encoding of the predicted reference value to be added to a header (Cols. 9-10, Lines 58-67 & 1-9: The reference values, generated depending on what data is orthogonally transformed (Figure 4C, left edge) are independently vector quantized. Col. 11, Lines 37-43: The code length of vector quantization can be varied, thus variable length coding of the predicted reference value, which is to be added to a header), and

output the encoded AC components along with the encoded predicted reference value added to the header as a bit stream (Figure 1: Data from the code data memory (17) sends the data to the transmitting unit (18) which allows to output the data as a bit stream, which included the AC components and predicted reference value, as shown above. To transmit data in a file, the file has to have a header so that when it is received, it can be decoded)).

Maeda fails to teach a differential unit for obtaining values between the DC components output from said converter and the predicted reference value generated by

said predicted reference value generator, said image encoding apparatus carries out quantizing and variable-length encoding of the difference values obtained by said differential unit and outputs the encoded difference values as a bit stream.

However, in the same field of endeavor, AAPA teaches a differential unit obtaining values between the DC components output from said converter and the predicted reference value generated by said predicted reference value generator (Page 1, Lines 21-27: The conventional image encoding apparatus then obtains difference values between DC components (from first step) and the predicted values (second step, using the predicted reference values generated by Maeda);

said image encoding apparatus carries out quantizing and variable-length encoding of the difference values obtained by said differential unit; and outputs the encoded difference values as a bit stream (Page 1, Lines 21-27: The image encoding apparatus carries out compression by (quantization) and variable-length encoding of the difference values. To show that this is a well known feature of MPEG encoding, Awano (U.S. Pub. No.: 2005/0069215) is relied upon to provide evidence of the teachings relied upon in AAPA. Awano's Paragraph 4: As is well known in the MPEG scheme, the data is quantized and the quantized data is subjected to variable length coding and then outputted as a stream).

One of ordinary skill in the art guided by Maeda and AAPA, could have combined the encoding apparatus and Maeda which includes generating a predicted reference value and incorporate the differential unit of AAPA to create a difference between Maeda's predicted reference value and the DC components prior to Maeda's quantization step. This would allow for creating difference values, which require less memory to be used to encoding the image, thereby encoding vast amount of image data

using less memory, which also saves bandwidth during the transmission data. The modification does not change the respective functions of Maeda's image processing apparatus, and the image (MPEG) encoding of AAPA, where the combination would yield nothing more than the predictable result of an image encoding apparatus which transforms the image to generate DC components and AC components, generating a predicted reference value of the left-edge of the image frame, calculating the differences between the DC component and the predicted reference value, and then encoding by quantizing and variable length coding of the AC components, difference values, and the predicted reference value which is to be added to a header, and the outputs the encoded data as a bit stream.

2) Regarding Claim 2, the combination of Maeda and AAPA teaches the limitations of claim 1, where Maeda further teaches said predicted reference value generator generates the predicted reference value of each image frame by obtaining an average value, mode or median of the DC components of the left-edge blocks of the image frame (Col. 2, Lines 31-37: mean values in each sub-block (left-edge, as illustrated in Figure 4C) are obtained).

3) Regarding Claim 21, Maeda teaches an image encoding method comprising: receiving an image signal, and carrying out orthogonal transformation, by utilizing a converter, on a block by block basis of an image flame to convert the image signal of individual block to DC components and AC components (Figure 1: Unit 13 is a orthogonal transform unit which transforms the image input on a block by block basis to convert the image signal into individual blocks of DC and AC components);

receiving the image signal, and generating a predicted reference value of each image frame from DC components obtained by orthogonal transformation of left-edge blocks of the image frame (6072910 Figure 4C: When the power concentrates are large in the horizontal edge, the blocks are independently vector-quantized (Cols. 9-10, Lines 58-67 &1-9), which is obtained by orthogonal transformations of the horizontal edge (left-edge blocks) (Col. 9, Lines 45-57), which generates a reference value as a result of the steps);

quantizing and variable-length encoding of the AC components (Col. 4, Lines 12-20: The coding apparatus codes image data of every block, every block including AC components, which includes quantizing (and VLC) the data);

quantizing and variable-length encoding of the predicted reference value to be added to a header (Cols. 9-10, Lines 58-67 & 1-9: The reference values, generated depending on what data is orthogonally transformed (Figure 4C, left edge) are independently vector quantized. Col. 11, Lines 37-43: The code length of vector quantization can be varied, thus variable length coding of the predicted reference value, which is to be added to a header); and

outputting the encoded AC components and the encoded predicted reference value added to the header as a bit stream (Figure 1: Data from the code data memory (17) sends the data to the transmitting unit (18) which allows to output the data as a bit stream, which included the AC components and predicted reference value, as shown above. To transmit data in a file, the file has to have a header so that when it is received, it can be decoded)).

Maeda fails to teach obtaining difference values between the DC components and the predicted reference value; quantizing and variable-length encoding of the difference values; and outputting the encoded difference values added to the header as a bit stream.

However, in the same field of endeavor, AAPA teaches obtaining difference values between the DC components and the predicted reference value (Page 1, Lines 21-27: The conventional image encoding apparatus then obtains difference values between DC components (from first step) and the predicted values (second step, using the predicted reference values generated by Maeda);

quantizing and variable-length encoding of the difference values ; and outputting the encoded difference values added to the header as a bit stream (Page 1, Lines 21-27: The image encoding apparatus carries out compression by (quantization) and variable-length encoding of the difference values. To show that this is a well known feature of MPEG encoding, Awano (U.S. Pub. No.: 2005/0069215) is relied upon to provide evidence of the teachings relied upon in AAPA. Awano's Paragraph 4: As is well known in the MPEG scheme, the data is quantized and the quantized data is subjected to variable length coding and then outputted as a stream).

One of ordinary skill in the art guided by Maeda and AAPA, could have combined the encoding apparatus and Maeda which includes generating a predicted reference value and incorporate the differential unit of AAPA to create a difference between Maeda's predicted reference value and the DC components prior to Maeda's quantization step. This would allow for creating difference values, which require less memory to be used to encoding the image, thereby encoding vast amount of image data using less memory, which also saves bandwidth during the transmission data. The modification does not change the respective functions of Maeda's image processing apparatus, and the image (MPEG) encoding of AAPA, where the combination would yield nothing more than the predictable result of an image encoding apparatus which transforms the image to generate DC components and AC components, generating a

predicted reference value of the left-edge of the image frame, calculating the differences between the DC component and the predicted reference value, and then encoding by quantizing and variable length coding of the AC components, difference values, and the predicted reference value which is to be added to a header, and the outputs the encoded data as a bit stream.

4) Regarding Claim 22, the combination of Maeda and AAPA teaches the limitations of claim 21, where Maeda further teaches generating the predicted reference value of each image frame by obtaining an average value, mode or median of the DC components of the left-edge blocks of the image frame (Col. 2, Lines 31-37: mean values in each sub-block (left-edge, as illustrated in Figure 4C) are obtained).

5) Regarding Claims 17 and 24, the recited limitations are for a decoder, which decodes the encoded image as shown in claim 1. As it is well known in the art to a person of ordinary skill at the time of the invention, decoding is the reverse steps of encoding, which is well known as seen in Matsuhara's teachings at Paragraph 46 (U.S. Pub. No.: 2004/0161156), which describes that decoding is the reverse steps of the processes (encoding) described, and since Maeda and AAPA teach encoding, performing the combination of steps, as analyzed above, in reverse would accomplish the decoding steps as recited.

Particularly, Maeda teaches quantizing and variable length encoding of AC components (illustrated in the analysis of claim 1). Performing these steps in reverse would decode the variable-length encoded data (difference values and AC components)

in the received data stream (Figure 1, "Reception") and decode reference values of each frame (which is taught by Maeda).

Maeda's teachings in conjunction with AAPA's teachings of a differential unit which subtracts the value from Maeda's reference value generator and a DC component in reverse order, would allow for adding the difference values and the predicted reference value, which are decoded by a variable-length decoder, which is obvious from Maeda's teachings.

Furthermore, when AAPA teaches carrying out a wavelet transform, as identified in the analysis of claim 1, performing the reverse (well known inverse wavelet transform) would output a decoded image signal by carrying out dequantization and inverse orthogonal transformation of the AC components and the DC components obtained by said adder.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the steps of Maeda and AAPA in reverse order to perform decoding.

4. Claims 3 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda in view of AAPA and in further view of Pesquet-Popescu et al. (U.S. Pat. No.: 6,519,284, "Pesquet-Popescu").

1) Regarding Claim 3, while the combination of Maeda and AAPA teach the limitations of claim 1, they fail to teach the limitations of claim 3.

However, in the same field of endeavor, Pesquet-Popescu teaches said predicted reference value generator generates the predicted reference value of each of regions of a present image frame from the DC components resulting from orthogonal transformation of left-edge blocks of the regions of a past image frame or future image frame (Claim 1: Encoding of the lowest frequency information (DC components) involves using values (predicted reference value) at the same location in past frames and neighbouring locations in the current frame).

Using the values obtained from a past frame as the values in the current frame allows for higher compression due to the fact that the same data in both frames requires only half of the data, as taught by Pesquet-Popescu, than compared to saving both sets of predicted reference value data in each frame as taught by Maeda, thus achieving better results.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Pesquet-Popescu to AAPA and Maeda.

2) Regarding Claim 23, while the combination of Maeda and AAPA teach the limitations of claim 21, they fail to teach the limitations of claim 23.

However, in the same field of endeavor, Pesquet-Popescu teaches said predicted reference value generator generates the predicted reference value of each of regions of a present image frame from the DC components resulting from orthogonal transformation of left-edge blocks of the regions of a past image frame or future image frame (Claim 1: Encoding of the lowest frequency information (DC components) involves using values (predicted reference value) at the same location in past frames and neighbouring locations in the current frame).

Using the values obtained from a past frame as the values in the current frame allows for higher compression due to the fact that the same data in both frames requires only half of the data, as taught by Pesquet-Popescu, than compared to saving both sets of predicted reference value data in each frame as taught by Maeda, thus achieving better results.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Pesquet-Popescu to AAPA and Maeda.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nirav G. Patel whose telephone number is (571)270-5812. The examiner can normally be reached on Monday - Friday 8 am - 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nirav G. Patel/
Examiner, Art Unit 2624

/CHARLES KIM/
Primary Examiner, Art Unit 2624